



Original Article

Prevalence of Musculoskeletal Injuries in Shiraz Male Wushu Players: A Cross Sectional Study

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ABSTRACT

Background: Wushu is one of the martial arts that combines explosive strength and speed movements with combat techniques. Most studies to date of wushu-related injuries have been published in Chinese languages. No published studies have reported the prevalence of these injuries in Iran. Therefore, the aim of the present study was to determine the prevalence of musculoskeletal injuries in male wushu players in Shiraz.

Methods: Male wushu athletes aged 18 to 30 years were included in this cross sectional study if they had been practicing for 2 hours per session, twice a week during the past 3 years. The athletes were recruited by convenience sampling from 30 wushu clubs in Shiraz, Iran. The sample size was 165. The study was conducted from June to September 2016. Each participant was asked to complete an information questionnaire about his musculoskeletal injuries related to wushu during the previous year.

Results: About two third (65.45%) of wushu players had one or more injuries during the previous year. Severe injuries were most commonly located in the head/neck and knee/tibia areas, and inflammation was more prevalent than the other types of injuries.

Conclusion: Wushu players in this study reported a high prevalence of injuries affecting different parts of the body.

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Introduction

Wushu is one of the most popular traditional martial arts that originated from China. Most other Asian martial arts styles are derived from wushu [1]. In wushu training, practitioners must combine flexibility with speed and powerful execution [2]. Traditional wushu consists of two types: sanda and taolu. Sanda (sometimes called sanshou) is a competitive, unarmed fighting sport developed from traditional wushu techniques, and uses

punching, kicking, throwing, wrestling and defensive techniques. Taolu is a competitive sport that includes attack and self-defense techniques, and can be performed individually or in groups. These techniques focus on sets of body movements including arm and leg movements, jumps, sweep movements and maintenance of balance. Various techniques used in different forms of taolu can be executed unarmed or with a weapon [2].

Injuries in martial arts have been reported in many previous studies. For instance, McLatchie et al. found that in 10% of 295 karate contests, severe injuries led participants to withdraw from competition [3]. Another previous study reported an incidence of one injury per every 3.7 competitive karate matches [4]. Moreover, contusions, abrasions, lacerations, sprains, strains,

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fractures and dislocations are known to be common injuries in martial arts [5]. According to Pieter et al., injuries in judo and taekwondo are most prevalent in the upper limbs; whereas in karate, some areas in the head and face tend to get injured [6]. Ghofrani et al. noted that the most common types of injury were contusion (56.3%) in aikido, strain (29.6%) in kyokushin karate, and sprain (31.2%) in karate. In all these sports, the most frequent site of injury was the lower limbs (68.4% in aikido, 34.9% in kyokushin and 41.3% in karate) [7]. Another study reported that the prevalence of injuries in kyokushin was higher than in traditional karate [8]. In karate, injuries are most common in the head and face, where they account for 32.4 to 49.3% of all injuries [9-12].

In the context of the current popularity of martial arts, athletes' health and safety have become the focus of attention. In addition to the high treatment costs of athletic injuries, research has focused on recognizing common injuries associated with martial arts [13]. Wushu, with its combination of explosive strength, speed movements and combat techniques, makes practicing athletes vulnerable to a number of sports injuries. Although wushu is an old sport, little or no research specifically on this mode of martial arts has been done in non-Chinese-speaking countries, including Iran. We designed this study to investigate the prevalence of musculoskeletal injuries in male wushu athletes in the city of Shiraz.

Methods

This descriptive survey was conducted between June and September 2016 in wushu clubs located in the city of Shiraz, Iran. Ethical approval for the study was provided by ethics committee of Shiraz University of Medical Sciences (SUMS) in accordance with the standards of the Helsinki declaration (IR.SUMS.REC.1394.S.655). The sample size (n=165) was estimated based on the previous study [14]. Male wushu athletes aged 18 to 30 years were included in this cross sectional study if they had been practicing for 2 hours per session, twice a week, during the past 3 years. The athletes were recruited by convenience sampling from 30 wushu clubs.

Before participating in this study, each athlete completed an informed consent form and then was enrolled. Participants with congenital musculoskeletal disorders or any history of musculoskeletal surgery due to non-wushu-related training were excluded from the study. A two-part

information questionnaire was used to collect data on wushu-related injuries. The first part was used to record personal data on age, height and weight, and the second part focused on injury prevalence and type, the body regions involved, and the number of repeated injuries with any definition of exposure (e.g. training and competition) during the previous year. All the questionnaires were completed according to self-report and physician diagnosis of musculoskeletal injuries. Statistical analyses were done with SPSS version 21 software (IBM SPSS, Inc., Chicago, IL, USA) and descriptive analysis was used. Also, Chi-squared test was used to compare prevalence of taolu and sanda groups and an alpha level of $P < 0.05$ was considered as the level of statistical significance.

Results

A total of 165 male wushu players aged between 18 to 30 years completed the information questionnaires. From the population, 112 athletes practiced sanda and 53 athletes practiced taolu. One or more injuries during the previous year were reported by 108 (65.45%) wushu players. The most frequently injured part of the body was the head/neck area (especially the nose), which accounted for 72 (43.63%) of the injuries during the previous year. The demographic characteristics of the participants are summarized in Table 1.

The number and percentage of injuries in different body regions are shown in Table 2. After head/neck injuries, the most frequently involved area was the knee/tibia, which accounted for 34 (20.6%) of all reported injuries.

We recorded injury frequencies as one or more than one injury during the previous year. As shown in Table 3, the highest relative percentage frequency was found for the knee/tibia region.

The contributions of different types of injuries to the overall prevalence were 85.29% for inflammation, 11.76% for ligament strain or rupture, and 2.94% for fracture of the knee or tibia. In the wushu athletes we studied, the most common injuries of the ankle or toes were sprain (70.88%), inflammation (16.64%), ligament tear (8.32%) and fracture (4.16%). Shoulder region injuries consisted of inflammation (53.86%), dislocation (30.76%) and ligament strain/tear (15.38%). In the wrist/fingers, 83.34% of injuries were inflammation, 8.33% were ligament sprain and 8.33% were tendon sprain. Some participants also reported trauma with mild inflammation in the other body

Table 1: Demographic characteristics of the participants

Variable	Mean±SD	Max	Min
Age (years)	22±2.0	28	18
Height (cm)	178±7.08	195	158
Weight (kg)	74.8±8.0	100	50
BMI(kg/m ²)	23.28±1.98	29.05	17.72

Table 2: Distribution of injuries in different body regions

Body region	Head/ Neck	Knee/ Tibia	Ankle/ Toes	Wrist/ Fingers	Elbow/ Forearm	Shoulder/ Arm	Hip/ Femur	Spine/ Ribs
Number	59	34	24	12	12	13	4	7
Percentage	36.37	20.60	14.54	7.27	7.27	7.87	2.42	4.24

Table 3: Frequency of injuries in different body regions

Body region	Numbers & percentages of one injury	Numbers & percentages of more than one injury	Relative percentage of more than one injury
Knee / Tibia	17 (50%)	17 (50%)	29.82%
Ankle / Toes	9 (37.25%)	15 (62.50%)	26.31%
Wrist / Fingers	6 (50%)	6 (50%)	10.52%
Elbow / Forearm	4 (33.33%)	8 (66.67%)	14.03%
Shoulder / Arm	8 (61.54)	5 (38.46%)	8.77%
Hip / Femur	3 (75%)	1 (25%)	1.75%
Spine / Ribs	2 (28.58%)	5 (71.42%)	8.77%

regions such as the elbow, forearm, hip, femur, spine and ribs which did not require medical consultation.

Overall, data analysis with Chi-squared test revealed that the prevalence of injuries was 58.50% during taolu and 68.75% during sanda. However, the difference between these two modalities of wushu was not statistically significant ($P=0.138$).

Discussion

The results showed that the overall prevalence of injuries in male wushu athletes in Shiraz was 65.45% during the previous year. Our results are in line with those of Yiemsiri et al., who concluded that wushu is associated with higher rates of injury relative to other martial arts, because wushu is a combat sport where each player attacks his opponents to score points [2].

Another study on children and adolescents reported that 28% of karate-ka athletes sustained injuries [15]. According to Cantu and Micheli, rapid growth of the musculoskeletal system in normal adolescents results in muscle-tendon unit tightness and inflexibility [16]. Karate training may improve muscle-tendon unit flexibility in children or adolescents and prevent musculoskeletal problems caused by overuse [17]. The higher overall rate of injuries in the present study (65.45%) may be attributed to the greater speed and force used by our older participants. In addition, as a rule, our participants did not wear protective body gear during their practice sessions.

Our results showed that inflammation was the most frequent type of injury in most body regions. In contrast, other researchers found that contusions/abrasions were the most common injury in martial arts. One possible explanation for the difference between our results and earlier reports is that studies of professional karate-ka athletes were done during competition rather than during practice [5, 12]. During tournaments, the training time is longer than usual practice sessions, and to score points, competitors execute more powerful techniques that are likely to lead to a higher prevalence of major injuries.

Our comparison of injury rates in different parts of the body of wushu athletes showed that the highest rates of injury were in the head and face. Rahimi et al. [9] and Peeri et al. [11] also reported higher injury rates in the head and neck. Head injuries can cause severe lesions including hematoma, contusion and loss of consciousness, and even death. Therefore, protective head gear should be used during all practice sessions, and appropriate medical care should be available on site. After head and

neck injuries, the second most frequent site of injury in our sample of wushu players was the lower extremities. This finding may be due to the use of the lower limbs rather than the upper limbs to attack wushu opponents. An additional factor that may contribute to lower limb injuries is that players do not use protective equipment for their legs, ankles or feet.

This research has some limitations. The participations were men aged between 18 and 30 years, so we are not able to generalize our results to female players or other age groups. Further research will be required in larger samples that include both genders. In addition, we suggest that future studies should be designed to compare the prevalence of injuries during competition versus those that occur during training sessions.

Conclusion

It can be concluded that wushu is associated with high percentages of injury to different parts of the body. Severe injuries in our sample of wushu players were located most frequently in the head/neck and knee/tibia areas. Besides, the injury rate was higher in the knee/tibia area than other body regions.

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